



500.43123X00

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Koichi UENO

Serial No.: 10/658,395

Filed: September 10, 2003

For: STORAGE DEVICE AND STORAGE DEVICE CONTROL

**PETITION TO MAKE SPECIAL  
UNDER 37 CFR §1.102(d) and MPEP §708.02, VIII**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

February 15, 2005

Sir:

Applicant previously submitted this Petition to Make Special on December 29, 2004 with an incorrect application number (Application No. 09/886,976).

**1. Petition**

Applicant hereby petitions to make this application Special, in accordance with 37 CFR §1.102(d) and MPEP §708.02, VIII. The present invention is a new application filed in the United States Patent and Trademark Office on September 10, 2003 and as such has not received any examination by the Examiner.

**2. Claims**

Applicant hereby represents that all the claims in the present application are directed to a single invention. If upon examination it is determined that all the

claims presented are not directed to a single invention, Applicant will make an election without traverse as a prerequisite to the granting of special status.

### **3. Search**

Applicant hereby submits that a pre-examination search has been made by a professional searcher, (a copy of which is attached), in the following classes and subclasses:

<u>Class</u>	<u>Subclass</u>
707	202, 203, 204
711	161, 162, 202
714	6

### **4. Copy of References**

A listing of all references found by the professional searcher is provided on a Form PTO-1449 and copies of the references and the Form PTO-1449 are submitted as part of an Information Disclosure Statement (IDS) filed on even date.

### **5. Detailed Discussion of the References and Distinctions Between the References and the Claims**

Below is a discussion of the references uncovered by the search and cited in the IDS filed on even date that appear to be most closely related to the subject matter encompassed by the claims of the present application, and which discussion particularly points out how Applicant's claimed subject matter is

distinguishable over those references. All other references uncovered by the search and cited in the IDS filed on even date are **not** treated in detailed herein.

**a. Detailed Discussion of the References**

**U.S. Patent No. 6,212,531 (Blea)** discloses a method and apparatus for forming a point-in-time backup using a snapshot function. The backup is made from a snapshot of a source volume and is located in a work virtual volume.

**U.S. Patent No. 6,434,681 (Armangau)** discloses a data storage system that includes snapshot volumes 103, 104, and a snapshot copy facility for enabling writing of data without delay to a storage location being backed up.

**U.S. Patent No. 6,594,744 (Humlicek)** discloses a storage system in which a snapshot volume and one or more checkpoint volumes are formed from the same base volume. The checkpoint volumes of Humlicek are dependent on an image that was created concurrently and any images created thereafter, rather than a state of one of the volumes.

**U.S. Patent No. 6,651,075 (Kusters)** discloses a system and method for maintaining multiple temporal snapshots of a common base volume. Before modification of existing data on a base volume, the existing data is copied to a differential file associated with the latest snapshot.

**U.S. Patent No. 6,751,715 (Hubbard)** discloses a system and method for disabling and recreating a snapshot volume. The creation of a point-in-time image of a base volume includes initiating a command to create a second point-in-time image of the base volume. The second point-in-time image is created

utilizing a repository volume having attributes retained from a repository volume created previously with respect to a first point-in-time image.

**U.S. Patent No. 6,771,843 (Huber)** discloses a data storage system in which snapshot volumes are used to preserve the state of the base volume at various points in time.

**U.S. Patent Application Publication No. 2004/0168034 (Homma)** discloses a storage apparatus that controls a primary volume and a secondary volume using a logical snapshot management table. At paragraph [0039], Homma states that there may be three volumes in a cascade arrangement wherein a first volume is a primary volume, a second volume is a secondary volume for the first primary volume as well as a second primary volume, and a third volume is a second secondary volume.

**U.S. Patent Application Publication No. 2004/0186900 (Nakano)** discloses a method and apparatus for maintaining a plurality of snapshots. The snapshots are maintained in a plurality of virtual volumes.

**b. Distinctions Between the References and the Claims**

The present invention as recited in the claims filed are not taught or suggested by any of the above noted references whether taken individually or in combination with each other or in combination with any of the other references now of record.

The present invention as recited in the claims is directed to a storage device and a method of controlling a storage device that includes a plural storage

volumes for storing data; means for receiving a request for update of the data at a prescribed point in time to be stored in a first of the storage volumes after the prescribed point in time; means for storing a duplicate of the data at the prescribed point in time requested to be updated onto a second of the storage volumes; and means for storing in an unused storage area of a third of the storage volumes a duplicate of the data at the prescribed point in time requested to be updated according to a state of the second storage volume.

The above described features of the present invention, particularly storing in an unused storage area of a third of the storage volumes a duplicate of the data at the prescribed point in time requested to be updated according to a state of the second storage volume, are not taught or suggested by any of the references of record whether taken individually or in combination with each other.

**6. Fee (37 C.F.R. 1.17(i))**

The fee required by 37 C.F.R. § 1.17(i) is to be paid by:

☒ the Credit Card Payment Form (attached) for \$130.00.

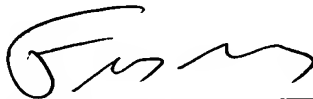
☐ charging Account \_\_\_\_\_ the sum of \$130.00.

A duplicate of this petition is attached.

Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of Mattingly, Stanger & Malur Deposit Account No. 50-1417 (referencing attorney docket no. 500.43123X00).

Respectfully submitted,

Mattingly, Stanger & Malur, P.C.



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Frederick D. Bailey  
Registration No. 42,282

**MATTINGLY, STANGER & MALUR, P.C.**

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PATENT, TRADEMARK  
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October 15, 2004

**CONFIDENTIAL**  
**Attorney/Client Privileged**

**Via Federal Express**

Re: Search for Petition to Make Special  
US Pat. App. No. 10/658,395  
**Your Ref: 340300261US01**  
Our Ref: H-0409-008

Mr. Noboru Otsuka  
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Dear Mr. Otsuka:

In accordance with your request of September 23, 2004, we have conducted a pre-examination prior art search in compliance with the requirements of MPEP 708.02 VIII (C) for filing a Petition to Make Special in the above-referenced patent application.

**Subject Searched**

The search was directed to the invention set forth in claims 1-16 in the above-referenced application. Specifically, claims 1-16 are directed to a storage device, and a method of controlling a storage device, in which a plurality of storage volumes are provided for storing data. When a request is received for updating the data at a prescribed point in time on a first of the storage volumes, a duplicate of the data at the prescribed point in time is stored on a second storage volume. A duplicate of the data at the prescribed point in time is also stored on an unused storage area of a third storage volume according to a state of the second storage volume. Such a state may be when the storage area of the second storage volume is smaller than a specified judgment value. Under additional aspects, the storage capacity of the unused storage area of the second storage volume may be shown on a user interface, and a warning may also be shown on the user interface when the unused storage area of the second volume reaches the judgment value.



### **Field of Search**

We conducted our initial search using the US Patent Office's Examiner Application Search Tool (EAST) database and image retrieval system. The EAST database contains images of all issued US patents and published US patent applications searchable by subclass or document number. The EAST database also contains the searchable full text of US patents issued since 1971; the searchable full text of all US published patent applications; and the searchable abstracts of a large number of patents and patent applications from the European and Japanese Patent Offices. We used keyword searching and forward/backward cross-referencing to locate relevant art, and we also searched, in particular, in the following *US Manual of Classification* subclasses:

<u>Class</u>	<u>Subclass</u>
707	202, 203, 204
711	161, 162, 202
714	6

Because of the large size of these subclasses, we used keywords to narrow the number of documents returned. We also conducted a search for foreign art using the European Patent Office's ESPACENET database, and we searched, in particular, in international subclass G06F011/14A4B1M8, directed to non-disruptive backup management. Additionally, we conducted a search for relevant literature using the DIALOG online databases, but we did not locate any articles of particular interest.

Please note that although we use our best efforts to attempt to locate all relevant prior art when conducting a search, patent searching is an inexact discipline. Due to imprecision in the USPTO's methods of classifying patents, and vagaries in the system of patent drafting in general, we can never guarantee that all relevant art has been located. Thus, there is always some possibility that other relevant patents may exist in addition to those listed herein. Should you desire that we conduct additional searching on this subject, please let us know.

### **Prior Art Located**

Patents and/or published patent applications located by our search that are believed to be of interest are as follows:

<u>Document No.</u>	<u>Inventor</u>
US 6212531	Blea, David Randall et al.
US 6434681	Armangau, Philippe
US 6594744	Humlicek, Donald R. et al.
US 6651075	Kusters, Norbert P. et al.
US 6751715	Hubbard, Scott et al.
US 6771843	Huber, Robin et al.
*US 20040168034	Homma, Sigeo et al.



**Document No.**  
\*US 20040186900

**Inventor**  
Nakano, Takahiro et al.

\*Indicates Hitachi patent or published application

## **Discussion**

As instructed, we have included below a discussion of each of these references explaining what each of the references teach, and explaining why the claimed invention is not anticipated by the reference, or is otherwise distinguished from the reference.

The patent to Blea, US 6212531, shows a method and apparatus for forming a point-in-time backup using a snapshot function. The backup is made from a snapshot of a source volume and is located in a work virtual volume. However, unlike the present invention, Blea makes no provision for storing a duplicate of the data on an unused storage area of a third storage volume according to a state of a second storage volume.

The patent to Armangau, US 6434681, shows a data storage system that includes snapshot volumes 103, 104, and a snapshot copy facility for enabling writing of data without delay to a storage location being backed up. However, Armangau does not teach the present invention, in which a duplicate of the data at the prescribed point in time is also stored on an unused storage area of a third storage volume according to a state of the second storage volume.

The patent to Humlicek, US 6594744, shows a storage system in which a snapshot volume and one or more checkpoint volumes are formed from the same base volume. However, the checkpoint volumes of Humlicek are dependent on an image that was created concurrently and any images created thereafter, rather than a state of one of the volumes. Thus, Humlicek does not teach the present invention, wherein a duplicate of the data at a prescribed point in time is stored on an unused storage area of a third storage volume according to a state of a second storage volume.

The patent to Kusters, US 6651075, shows a system and method for maintaining multiple temporal snapshots of a common base volume. Before modification of existing data on a base volume, the existing data is copied to a differential file associated with the latest snapshot. However, Kusters does not teach storing of a duplicate of the data at a prescribed point in time on an unused storage area of a third storage volume according to a state of a second storage volume.

The patent to Hubbard, US 6751715, shows a system and method for disabling and recreating a snapshot volume. The creation of a point-in-time image of a base volume includes initiating a command to create a second point-in-time image of the base volume. The second point-in-time image is created utilizing a repository volume having attributes retained from a repository volume created previously with respect to a first point-in-time

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Patent Department V, HITACHI, LTD.  
October 15, 2004  
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image. Thus, Hubbard does not teach the present invention, in which a duplicate of the data at a prescribed point in time is stored on an unused storage area of a third storage volume according to a state of a second storage volume.

The patent to Huber, US 6771843, shows a data storage system in which snapshot volumes are used to preserve the state of the base volume at various points in time. While Huber uses multiple snapshot volumes, unlike the present invention, Huber does not store a duplicate of the data at the prescribed point in time on an unused storage area of a third storage volume according to a state of a second storage volume.

The published US patent application to Homma, US 20040168034, shows a storage apparatus that controls a primary volume and a secondary volume using a logical snapshot management table. At paragraph [0039], Homma states that there may be three volumes in a cascade arrangement wherein a first volume is a primary volume, a second volume is a secondary volume for the first primary volume as well as a second primary volume, and a third volume is a second secondary volume. Thus, while Homma teaches three volumes, Homma does not teach the present invention, wherein a duplicate of the data at a prescribed point in time is stored on an unused storage area of a third storage volume according to a state of a second storage volume.

The published US patent application to Nakano, US 20040186900, shows a method and apparatus for maintaining a plurality of snapshots. The snapshots are maintained in a plurality of virtual volumes. However, Nakano does not teach the present invention, in which a duplicate of the data at a prescribed point in time is stored on an unused storage area of a third storage volume according to a state of a second storage volume.

## **Conclusion**

As you requested, two CD-R's are enclosed containing electronic copies of the references located and this report. Our invoice is enclosed for services and disbursements expended in conducting the search. Should you have any questions regarding the search or its results, please let us know.

Best regards,

Mattingly, Stanger & Malur, P.C.

By:

Colin D. Barnitz

Enclosures